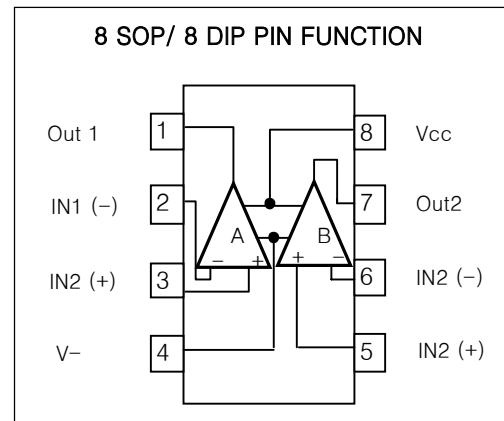


DUAL OPERATIONAL AMPLIFIERS

LM358

FEATURES

- Internally frequency compensated for unity gain
- Large DC voltage gain : 100dB
- Wide power supply range : 3V~32V(or $\pm 1.5V \sim 16V$)
- Input common-mode voltage range includes ground
- Large output voltage swing : 0V DC to $V_{CC} - 1.5V$ DC
- Power drain suitable for battery operation



ORDERING INFORMATION

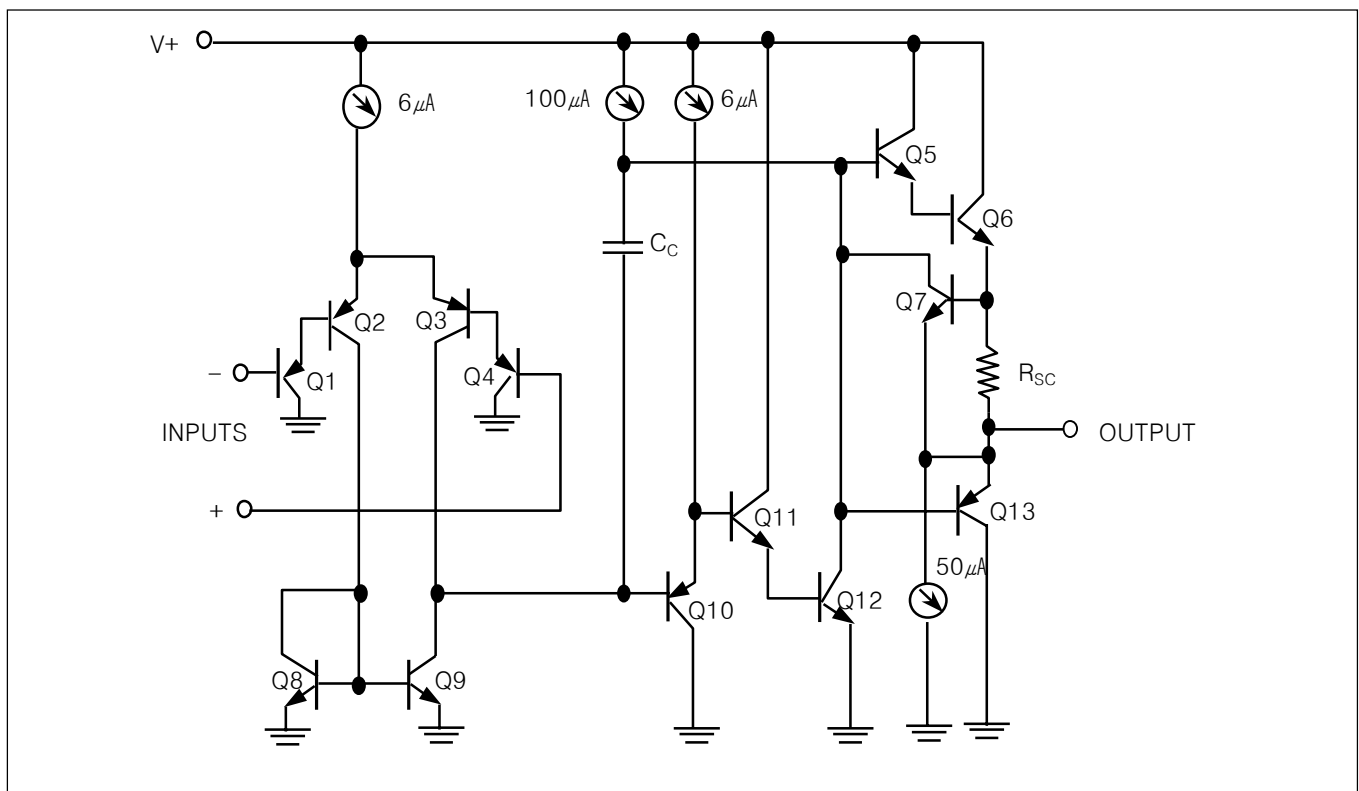
Device	Package
LM358D	8 SOP
LM358N	8 DIP

DUAL OPERATIONAL AMPLIFIERS

LM358 consists of four independent, high gain, internally frequency compensated operational amplifiers which were designed specifically to operate from a single power supply over a wide range of voltage. Operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage.

Application areas include transducer amplifier, DC gain blocks and all the conventional OP amp circuits which now can be easily implemented in single power supply systems.

EQUIVALENT CIRCUIT



ABSOLUTE MAXIMUM RATINGS

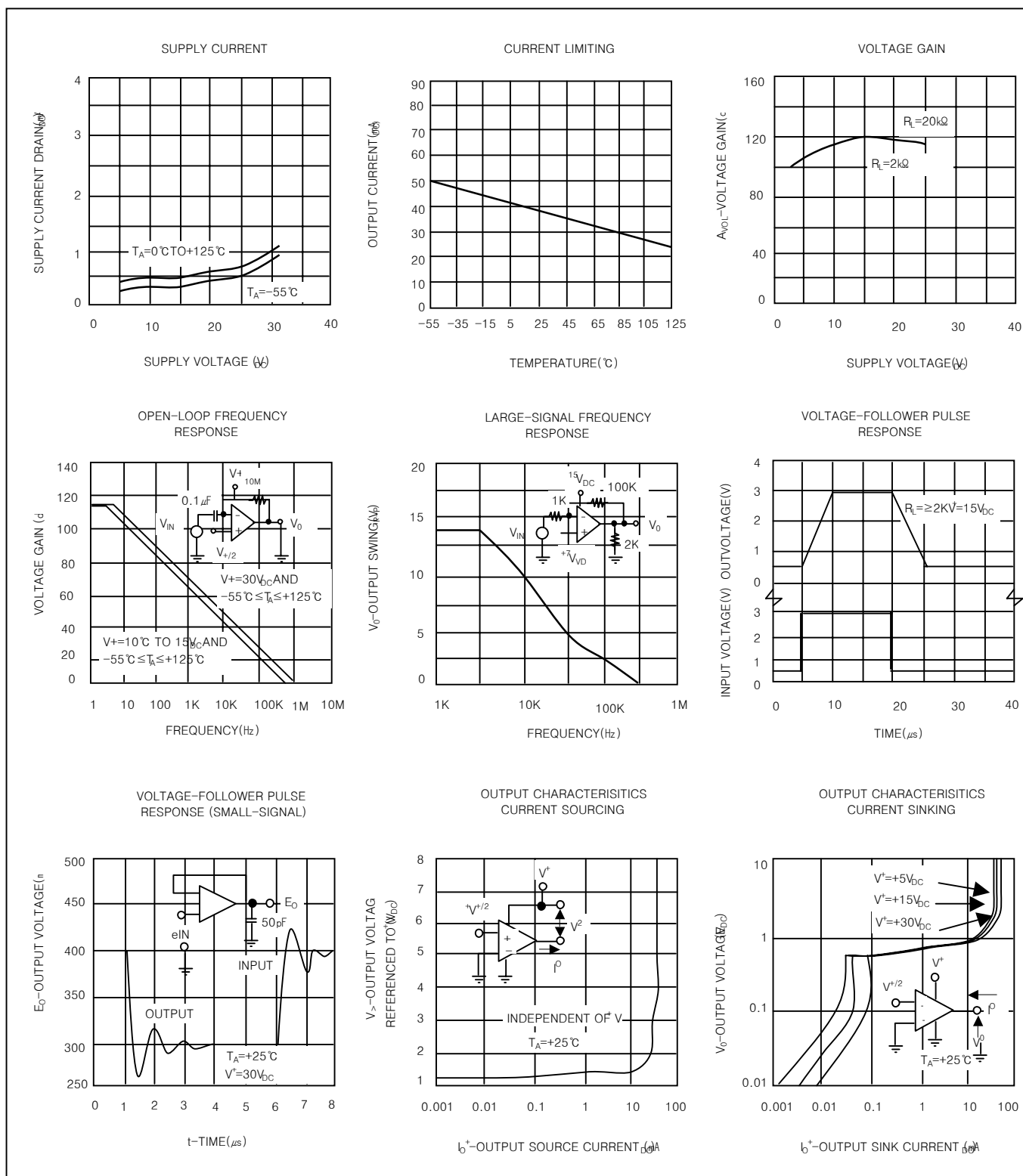
CHARACTERISTIC	SYMBOL	VALUE	UNIT
Supply Voltage	V_{CC}	± 16 or 32	V
Differential Input Voltage	$V_{I(DIFF)}$	± 32	V
Input Voltage	V_I	-0.3 to $+32$	V
Output Short Circuit to GND $V_{CC} \leq V$ $T_A = 25^\circ\text{C}$ (One Amp)		Continuous	
Operating Temperature Range	T_{OPR}	$0 \sim +70$	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-65 to $+150$	$^\circ\text{C}$

Electrical characteristics at specified free-air temperature, $V_{CC} = 5V$ (unless otherwise noted)

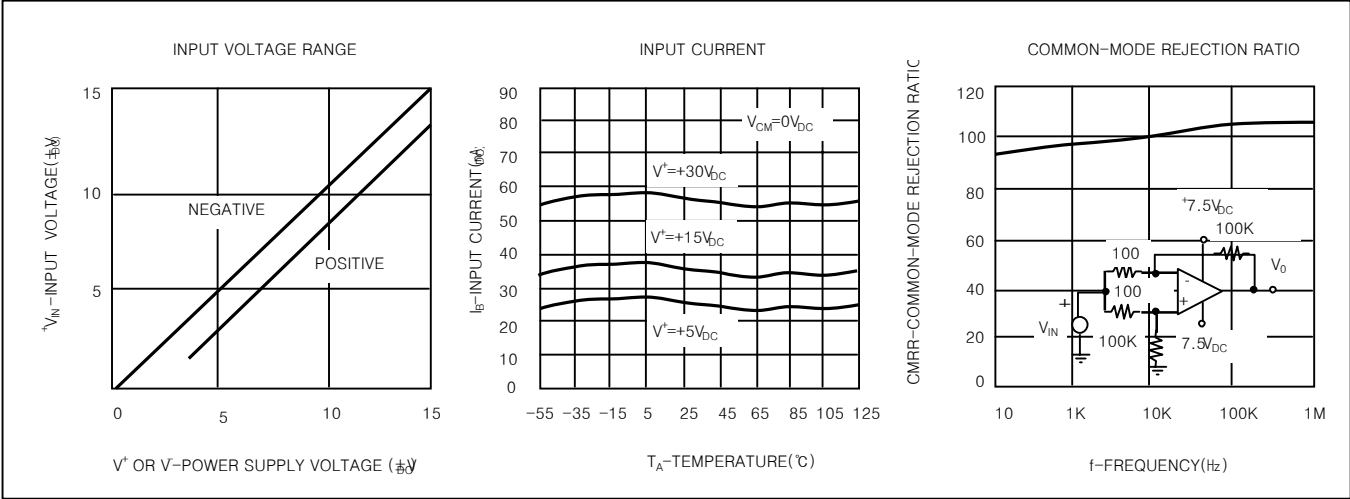
PARAMETER	TEST CONDITIONS*		LM358			UNIT
			MIN	TYP	MAX	
V _{IO} Input Offset Voltage	V _{CC} =5V to MAX, V _{IC} =V _{ICR} MIN, V _O =1.4V	25 °C		3	7	mV
		Full Range			9	
αV _{IO} Average Temperature Coefficient of Input Offset Voltage		Full Range		7		μV/°C
I _{IO} Input Offset Current	V _O =1.4V	25 °C		2	50	nA
		Full Range			150	
αI _{IO} Average Temperature Coefficient of Input Offset Current		Full Range		10		pA/°C
I _{IB} Input Bias Current	V _O =1.4V	25 °C		-20	-250	nA
		Full Range			-500	
V _{ICR} Common-Mode Input Voltage Range	V _{CC} =5V to MAX	25 °C	0toV _{CC} -1.5			V
		Full Range	0toV _{CC} -2			
V _{OH} High-Level Output Voltage	R _L ≥ 2kΩ	25 °C	V _{CC} -1.5			V
	V _{CC} =MAX, R _L =2kΩ	Full Range	26			
	V _{CC} =MAX, R _L ≥ 10kΩ	Full Range	27	28		
V _{OL} Low-Level Output Voltage	R _L ≥ 10kΩ	Full Range		5	20	mV
A _{VD} Large-Signal Differential Voltage Amplification	V _{CC} =15V, V _O =1V to 11V, R _L ≥ 2kΩ	25 °C	25	100		V/mV
		Full Range	15			
CMRR Common-Mode Rejection Ratio	V _{CC} =5V to MAX, V _{IC} =V _{ICR} MIN	25 °C	65	80		dB
K _{SVR} Supply Voltage Rejection Ratio(ΔV _{CC} /ΔV _{IO})	V _{CC} =5V to MAX	25 °C	65	100		dB
V _{O1} /V _{O2} Crosstalk Attenuation	f=1 kHz to 20kHz	25 °C		120		dB
I _O Output Current	V _{CC} =15V, V _{ID} =1V, V _O =0	25 °C	-20	-30		mA
		Full Range	-10			
	V _{CC} =15V, V _{ID} =-1V, V _O =15V	25 °C	10	20		
		Full Range	5			
	V _{ID} =-1V, V _O =200mV	25 °C	12	30		μA
I _{OS} Short-Circuit Output Current	V _{CC} at 5V, GND at -5V, V _O =0	25 °C		±40	±60	mA
I _{CC} Supply Current (Two Amplifiers)	V _O =2.5V, No Load	Full Range		0.7	1.2	mA
	V _{CC} =MAX, V _O =0.5V _{CC} , No Load	Full Range		1	2	

* All characteristics are measured under open-loop conditions with zero common-mode input voltage unless otherwise specified <<MAX>> V_{CC} for testing purpose is 30V. Full range is 0°C to 70°C .

TYPICAL PERFORMANCE CHARACTERISTICS



TYPICAL PERFORMANCE CHARACTERISTICS (CONTINUED)



TYPICAL APPLICATIONS

